## REMARKS

This amendment is responsive to the Final Office Action dated September 17, 2002. Applicant has amended claims 1, 11, 14, 15, 19, 27, 28, 29 and 35, and canceled claims 12, 13, 20, 30 and 34. Claims 1-11, 14-19, 21-29, 31-33, and 35 are now pending. A complete version of the claims showing changes pursuant to 37 CFR § 1.121(c)(ii) is attached. In the attached version of the claims, Applicant has used underlines to indicate inserted matter and strikeouts to indicate deleted matter.

In the Office Action, the Examiner rejected claims 1, 2, 4, 5, 8, 11-13, 15, 16, 19-21, and 27-28 under 35 U.S.C. 102(e) as being anticipated by Yamada et al. '267; rejected claims 1-6, 8, 11-16, 19-21, 24, and 27-28 under 35 U.S.C. 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yamada et al. '267; rejected claims 1-5, 8, 11-16, 19-21, and 27-28 under 35 U.S.C. 102(b) as being anticipated by JP 59-193560; rejected claims 1-5, 11-15, 19, 20, and 27-28 under 35 U.S.C. 102(b) as being anticipated by JP 60-029950; rejected claims 1-7, 11-15, 19, 20, and 24-28 under 35 U.S.C. 103(a) as being unpatentable over JP 60-029950; rejected claims 1-5, 8-23, 27-30, and 33-34 under 35 U.S.C. 102(b) as being anticipated by DeLaat '735; rejected claims 1-31 and 33-34 under 35 U.S.C. 103(a) as being unpatentable over DeLaat '735 in view of JP 60-029950 and Santoh et al. '469; and rejected claims 1-35 under 35 U.S.C. 103(a) as being unpatentable over DeLaat '735 in view of JP 60-029950, Santoh et al. '469, JP 02-150325 and Folger et al. '978.

As a preliminary note, Applicant thanks the Examiner for conducting the Examiner Interview of October 3, 2002. In the Examiner Interview, Applicant's representative discussed a number of issues with the Examiner including the meaning of the phrase "inverse of a desired replica disk pattern," the Examiner's position with respect to intended use, the general nature of the prior art being applied, and the claim limitations that recite etching down to a master disk substrate to define substantially flat master groove bottoms that correspond to flat land tops of the replica disk.

This amendment has made two changes to Applicant's claims. First, Applicant has amended claims 1, 11, 19, 28 and 29 to address the Examiner's intended use concerns. In particular, the amendment rearranged the wording of the claims to ensure that every independent claim positively recites *"creating an inverse of a desired replica disk pattern."* Second,

Applicant has amended all independent claims to include features similar to those previously recited in one or more of canceled claims 12, 13, 20, 30 and 34. The amendments to the claims raise no new issues and would require no further search. Moreover, the amendments are believed to place the application in condition for immediate allowance or, alternatively, to reduce the number of issues for appeal. Therefore, entry of the amendments is courteously solicited.

Applicant has rearranged the wording of the independent claims to positively recite *"creating an inverse of a desired replica disk pattern"* in order to more fully address the Examiner's intended use concerns. The Examiner can no longer ignore this limitation under the guise that it merely recites an intended use. The limitation recites a positive structural feature of the master disk that is exactly the opposite of the master disk patterns described in the applied references that relate to photoresistive etching processes.

In the Interview Summary relating to the Examiner Interview of October 3, 2002, the Examiner explained his rationale for not giving patentable weight to the recited feature of creating an inverse of a desired replica disk pattern on the master. In particular, the Examiner stated:

> The (E)xaminer has adopted the position that the language is somewhat akin to intended use and that one could pull a replica of the useful optical recording medium directly off the resist image. *Interview Summary of Examiner Interview of October 3, 2002.*

This statement underscores the fact that the Examiner recognizes the structural differences between a pattern that is the same as a desired pattern and a pattern that is an inverse of a desired pattern. The Examiner seems to be giving the claim limitation consideration, but rejecting it based on unknown authority, using the phrase "intended use" as a substitute for a legitimate patentablity analysis.

The Examiner states that one could pull replicas of a useful optical recording medium directly off the resist image. *Id.* Applicant does not dispute that replica disks pulled directly from a resist image would be the inverse of the master, and thus, if replica disks were pulled directly off the master, the master would have a pattern that was the inverse of a desired replica disk pattern. The Examiner, however, has not provided any prior art reference which discloses such a technique, or would have suggested the desirability of modifications to arrive at such a technique. Instead, the Examiner has relied on a dubious intended use position to avoid giving Applicant's structurally defined feature the patentable consideration it deserves.

Applicant is unaware of prior art references disclosing the creation of replica disks directly from a photoresist master. In optical disk manufacturing, stampers are created from the resist master specifically because the master cannot be used for direct creation of replica disks. In accordance with the prior art, a resistive master is generally destroyed upon making a next generation tool. Accordingly, in accordance with the prior art, replicas, i.e., multiple copies, generally cannot be made from a master. For this reason, in prior optical disk manufacturing, a resist master defines a replica disk pattern, and not an inverse of a replica disk pattern as recited in Applicant's claims. In the prior art, the stamper created from the resist master is used to create replica disks, which define replica patterns that are the same as the resist master. Applicant's claims are exactly the opposite in that the master defines an inverse of a replica disk pattern. A second generation stamper can be used to create the replica disks having the desired pattern that is the inverse of the pattern on the master.

If the Examiner is aware of a prior art teaching that discloses the creation of replicas, i.e., multiple copies, directly from a photoresist master, Applicant would like to be informed of such prior art in a legitimate patentablity analysis. To date, none of the references used to reject Applicant's claims for lack of novelty under 35 U.S.C. 102 discloses or suggests the creation of a pattern on the master that is inverse of a desired replica disk pattern. Accordingly, all the rejections under 35 U.S.C. 102 are clearly improper.

The only reference cited by the Examiner which might imply the creation of an inverse pattern on a master is a reference completely unrelated to photoresistive optical disk manufacturing, as recited in Applicant's claims. In particular, Folger et al. '978 teaches the creation of first, second, third or fourth generation replicas in the field of holography and optical gratings. The teaching of Folger et al. '978 may imply that *in the art of holography and optical gratings*, a master grating pattern can be defined to be the same as or the inverse of a desired grating pattern.

Applicant's claims, however, recite a photoresistive process, and Folger et al. '978 is completely unrelated to the field of photoresistive optical disk manufacturing. Moreover, the numerous references cited by the Examiner in the field of photoresistive optical disk manufacturing clearly illustrate the nature of that art, i.e., creating a pattern in the master that corresponds to a replica disk, and not an inverse pattern of the replica disk. A person with skill in

the art would not have turned to Folger et al. '978 to remedy deficiencies of Da Laat, or the other references cited by the Examiner with respect to Applicant's claims because none of the references would motivate a skilled person to do so. Moreover, one skilled in the photoresistive art would not expect to find solutions to problems by turning to references in the art of holographic gratings.

At a minimum, the Examiner must provide Applicant with a rationale of why a person with skill in the art would have been motivated to combine the teaching of Folger et al. '978 with that of photoresistive art such as Da Laat or the other applied references. Applicant submits that the only motivation to combine photoresistive art, such as Da Laat '735 or Yamada et al. '267, with non-photoresistive techniques of defining an inverse pattern in the master can be found only in Applicant's own disclosure. In particular, Applicant's specification identifies a number of advantages that can be achieved by the claimed process, as outlined in greater detail below.

The second amendment made by Applicant to all pending claims relates to the creation of flat master groove bottoms that correspond to flat land tops of a replica disk. In particular, Applicant has amended all independent claims to include features similar to those previously recited in one or more of canceled claims 12, 13, 20, 30 and 34. All claims now recite the creation of substantially flat master groove bottoms that correspond to flat tops of features of the desired replica disk.

Accordingly, all claims recite something akin to:

*1) a photoresistive process used to create...*

*2) a pattern on the master substrate that is an inverse of a desired replica disk pattern...*

*3) to define flat master groove bottoms that correspond to flat tops of the desired pattern for the replica disks.*

Applicant recognizes that Yamada et al. '267 and possibly JP 59-193560 and JP 60-29950 disclose etching down to the master substrate. However, none of those references disclose such etching to define an inverse of a desired replica disk pattern in which flat master groove bottoms correspond to flat tops of the desired pattern for the replica disks, as recited in Applicant's claims. As detailed in Applicant's specification, etching to define an inverse of a desired replica disk

pattern in which flat master groove bottoms that correspond to flat tops of the desired pattern for the replica disks facilitates the realization of a number of advantages.

As one example, Applicant's specification discusses how a photoresistive process used to create a pattern on the master substrate that is an inverse of a desired replica disk pattern to define flat master groove bottoms can facilitate the creation of features having a track pitch less than 2 times a spot size of a photoresistive system. See e.g., page 8, lines 20-25 and page 15, lines 15-22. In other words, the prior art techniques disclosed in Da Laat '735, Yamada et al. '267, and the other photoresistive art achieve track pitches that are more limited by a spot size of the laser used in the photoresistive process. In particular, the prior art track pitch generally cannot be made smaller than 2 times the spot size.

Applicant's claimed technique achieves a great advantage that can be realized in a number of different photoresist systems each having different spot sizes. In particular, the claimed technique can be used to define track pitches less than 2 times the spot size of the laser. This is a very useful advantage in that the same photoresistive system can be used to create media of improved storage density if Applicant's claimed technique is used. This advantage of Applicant's claims is described nowhere in the applied references. Accordingly, one of ordinary skill in the art simply would not have been cognizant of the desirability of the features set forth in Applicant's claims.

Another example of advantages stated in Applicant's specification in relation to the pending claims is the ability to achieve flat, coplanar land tops, which correspond to the groove bottoms of the master, since the pattern on the master is the inverse of the pattern of the replica disks. In particular, etching down to a master substrate in combination with defining a pattern to be an inverse of a desired replica disk pattern can achieve such flat coplanar land tops on the replicas. This is particularly advantageous for flyable media applications. See e.g., page 8, lines 16-18, and page 23, lines 15-24. Also, wide and flat lands with sharp corners may be achieved using the claimed process, which can improve tracking. See e.g., page 13, lines 12-13. These advantages are not described in the applied references. Applicant further notes that claims 10, 18 and 23 positively recite the creation of flyable media, which is not even addressed by the Examiner.

Yet another example of advantages in Applicant's specification in relation to the pending claims is the ability to control the size of land tops relative to the width of the grooves. See generally, page 11, lines 4-15.

None of the applied references discloses or suggests such advantages that can be achieved by a photoresistive process used to create a pattern on the master substrate that is an inverse of a desired replica disk pattern to define flat master groove bottoms that correspond to flat tops of the desired pattern for the replica disks. Moreover, even assuming that various features could be individually found in different references cited by the Examiner, Applicant's disclosure is the only reference providing motivation to perform such a photoresistive process to create a pattern on the master substrate that is an inverse of a desired replica disk pattern to define flat master groove bottoms that correspond to flat tops of the desired pattern.

In view of the forgoing remarks, Applicant requests entry of the amendments, reconsideration, and allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 09-0069. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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## VERSION SHOWING CHANGES TO THE CLAIMS

1. (Twice Amended) A method of making a data storage disk master comprising:

providing a master substrate; and

creating on the master substrate an inverse of a desired replica disk pattern including substantially flat master groove bottoms that correspond to flat tops of features of the desired replica disk pattern by:

specifying a photosensitive material layer thickness;

providing a layer of photosensitive material on the master substrate, the layer having an initial thickness corresponding to the specified photosensitive material layer thickness;

controlling optical exposure to the layer of photosensitive material; and

controlling development criteria of the layer of photosensitive material~~,~~

~~wherein specifying a photosensitive material layer thickness, controlling optical exposure and controlling development criteria collectively control the creation on the master of an inverse of a desired replica disk pattern to be formed in a replica disk~~.

2. The method of claim 1, wherein the inverse of the desired replica disk pattern includes an inverse of desired lands and grooves.

3. The method of claim 2, wherein at least some of the inverse of desired grooves have a depth greater than 50 nanometers.

4. The method of claim 2, wherein at least some of the inverse of desired lands have a width greater than 150 nanometers.

5. The method of claim 1, wherein the inverse of the desired replica disk pattern includes an inverse of desired surface variations.

6. The method of claim 5, wherein at least some of the inverse of desired surface variations have a depth of less than 50 nanometers.

7. The method of claim 5, wherein at least some of the inverse of desired surface variations have a width less than 150 nanometers.

8. The method of claim 1, further comprising creating a first-generation stamper from the master.

9. The method of claim 8, further comprising creating a second-generation stamper from the first-generation stamper.

10. The method of claim 9, further comprising creating flyable media exhibiting surface variations using the second-generation stamper.

11. (Twice Amended) A method of making a data storage disk master comprising:

providing a master substrate; and

creating on the master substrate an inverse pattern of lands and grooves of a replica disk including substantially flat master groove bottoms that correspond to flat land tops of the replica disk by:

specifying a thickness of photosensitive material;

coating the master substrate with the specified thickness of photosensitive material;

exposing the photosensitive material to a controlled amount of optical energy; and

exposing the photosensitive material to developer solution;

~~wherein the specified thickness of photosensitive material, the controlled amount of optical energy, and the exposure to developer solution collectively define on the master an inverse pattern of specified lands and grooves to be created in a replica disk.~~

~~12. (Canceled) The method of claim 11, wherein the inverse pattern has a substantially flat groove bottom.~~

~~13. (Canceled) The method of claim 12, wherein the substantially flat groove bottom is defined by a surface of the master substrate.~~

14. (Twice Amended) The method of claim 11, wherein at least some of the inverse pattern of ~~specified~~ grooves have a depth greater than 50 nanometers.

15. (Twice Amended) The method of claim 11, wherein at least some of the inverse pattern of ~~specified~~ lands have a width greater than 150 nanometers.

16. The method of claim 11, further comprising creating a first-generation stamper from the master.

17. The method of claim 16, further comprising creating a second-generation stamper from the first-generation stamper.

18. The method of claim 17, further comprising creating flyable media using the second-generation stamper.

19. (Twice Amended) A method of making a data storage disk master comprising:

providing a master substrate; and

creating on the master substrate an inverse pattern of surface variations of a replica disk including substantially flat master groove bottoms that correspond to flat tops of the surface variations of the replica disk by:

specifying a thickness of photosensitive material;

coating the master substrate with the specified thickness of photosensitive material;

exposing the photosensitive material to a controlled amount of optical energy; and

exposing the photosensitive material to developer solution;

~~wherein the specified amount of photosensitive material, the controlled amount of optical energy, and exposure to the developer solution collectively define a pattern on the master having an inverse of desired surface variations to be formed in a replica disk.~~

~~20. (Canceled) The method of claim 19, wherein the pattern having an inverse of desired surface variations has a flat master bottom defined by a surface of the substrate.~~

21. The method of claim 19, further comprising creating a first-generation stamper from the master.

22. The method of claim 21, further comprising creating a second-generation stamper from the first-generation stamper.

23. The method of claim 22, further comprising creating flyable media that exhibit surface variations using the second-generation stamper.

24. The method of claim 19, wherein at least part of the pattern having an inverse of desired surface variations has a depth less than 50 nanometers.

25. The method of claim 20, wherein at least part of the pattern having an inverse of desired surface variations has a depth less than 25 nanometers.

26. The method of claim 20, wherein at least part of the pattern having an inverse of desired surface variations has a width less than 150 nanometers.

27. (Amended) A method of making a data storage disk master for use in a reverse mastering, data storage disk molding process, the data storage disk master including master lands and master grooves, wherein the data storage disk molding process produces replica disks having a surface relief pattern with replica lands and replica grooves, the surface relief pattern having an orientation which is the inverse of the data storage disk master, the method comprising the steps of:

providing a master substrate; and

creating a pattern on the master substrate that is an inverse of a desired replica disk pattern by:

covering the master substrate with a layer of photosensitive material;

recording a surface relief pattern having master lands and master grooves in the data storage disk master, including the steps of exposing and developing the photosensitive material; and

controlling the exposing and developing of a specified thickness of photosensitive material to form master grooves extending down to a substrate interface between the master substrate and the layer of photosensitive material, such that the width of the master grooves at the substrate interface corresponds to a desired width of the replica lands, including the step of exposing the photosensitive material to obtain a wide flat master groove bottom defined by the master substrate, relative to a master land top.

28. (Amended) A method of making a disk master for use in making a replica disk in an inverse stamping process, the replica disk being capable of storing high volumes of information, the replica disk including a surface relief pattern with replica lands and replica grooves, the surface relief pattern having an orientation which is inverse of the disk master, the method comprising the steps of:

providing a master substrate; and

creating a pattern on the master substrate that is an inverse of a desired replica disk pattern by:

coating at least a portion of the master substrate with a layer of photosensitive material to form the disk master;

recording a surface relief pattern having master lands and master grooves in the master disk, including the steps of using a laser beam recorder for exposing the photosensitive material in a desired track pattern having a track pitch, and developing the photosensitive material; and

controlling the exposing and developing of the photosensitive material for forming master grooves extending down to a substrate interface between the master substrate and the photosensitive material, such that the width of the master grooves at the substrate interface corresponds to a desired width of the replica lands, including the step of exposing the

photosensitive material to obtain a wide, flat master groove bottom having a width greater than 100 nanometers defined by the master substrate, relative to a master lands top.

29. (Amended) A method comprising:

creating a master disk for use in a process in which the master disk is used to create a first generation stamper, the first generation stamper is used to create a second generation stamper, and the second generation stamper is used to create replica disks; and

creating a pattern in the master disk to have an orientation that is inverse of a desired pattern for the replica disks by coating a master substrate with a photosensitive material and exposing and developing the photosensitive material down to a substrate interface to define flat master groove bottoms that correspond to flat tops of the desired pattern for the replica disks.

~~30. (Canceled) The method of claim 29, wherein creating the pattern in the master disk having an orientation that is inverse of the desired pattern for the replica disks includes creating grooves in the master disk that correspond to lands to be created in the replica disks, wherein the grooves in the master disk extend down to a master disk substrate to define flat master groove bottoms such that lands created in the replica disks have flat land tops that have an inverse orientation to the flat master groove bottoms in the master.~~

31. The method of claim 30, wherein the flat master groove bottoms have a width greater than 100 nanometers defined by the master substrate.

32. The method of claim 29, further comprising:

creating the first generation stamper using the master disk;

creating the second generation stamper using the first generation stamper; and

creating the replica disks using the second generation stamper, wherein the replica disks are formed with the desired pattern.

33. The method of claim 29, wherein creating the pattern in the master disk having an orientation that is inverse of the desired pattern for the replica disks includes creating lands on

the master that correspond to grooves to be created in the replica disks, wherein the lands on the master have rounded tops.

~~34. (Canceled) The method of claim 33, wherein the grooves in the master disk extend down to a master disk substrate to define flat master groove bottoms.~~

35. (Amended) A method comprising:

creating a master disk;

creating a pattern in the master disk to have an orientation that is inverse of a desired pattern for the replica disks by coating a master substrate with a photosensitive material and exposing and developing the photosensitive material down to a substrate interface to define flat master groove bottoms that correspond to flat tops of the desired pattern for the replica disks;

creating a first generation stamper using the master disk;

creating a second generation stamper using the first generation stamper; and

creating the replica disks using the second generation stamper, wherein the replica disks exhibit the desired pattern.